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A wet season survey of animal trypanosomosis in Shongom local government area of Gombe state. Nigeria

Shamaki, B.U.[1]*, Obaloto, O.B.[1], Kalejaiye, J.O.[1], Lawani, F.A.G.[2], Balak, G.G.[1] and Charles D.[1]

[1]Nigerian Institute for Trypanosomiasis and Onchocerciasis Research (NITOR) Vom.,
[2]NITOR, Kaduna, Nigeria
*Corresponding author: Dr. Shamaki Bala Usman,E-mail: shamabala@yahoo.com.

ABSTRACT

Two hundred and three (203) blood samples were collected from randomly selected herd comprising; cattle, 68 (33.5%), sheep 57 (28.1%), goats 16 (7.9%), donkey, 3 (1.5%) and pigs 59 (29.1%) respectively. The blood samples were collected from animals and examined in seven villages from two districts (Filiya and Lapan) of Shongom Local Government Area. These total numbers of 203 comprises 47 (23.2%) males and 156 (76.8%) females. From the males, 15 (31.9%) were cattle, 11 (23.4%) sheep, 5 (10.6%) goats, 0 (0.0%) donkey and 16 (34.0%) boar while the females consist of 53 (34.0%) cattle, 46 (29.5%) sheep, 11 (7.1%) goats, 3 (1.9%) donkeys and 43 (27.6%) sow. The blood samples from these animals were analysed using a combination of thin and thick blood films and concentration methods. Eleven (5.42%) were found to be positive for hemoparasites. These comprise. *Trypanosoma vivax* 1 (9.1%), Microfilariae 1 (9.1%), *Babesia* 8 (72.7%) and 1 (9.1%) *Anaplasma*. The average packed cell volume (PCV) for infected and non infected males were 33.1 ± 3.3 and 33.4 ± 1.5 while that of females 31.5 ± 5.1 and 31.9 ± 0.8 respectively. *Babesia* spp were find to be higher in prevalence 8 (72.7%) while *T. vivax*, Microfilariae *and Anaplasma* accounts for least occurrence 1 (9.1%) each. This indicates high prevalence rate of ticks (vector of babesiosis) and absence of *Glossina* spp biological transmitters of zoonotic trypanosomiasis in the study area.

Key Words: Survey, Trypanosomosis, public health significance, Gombe state

INTRODUCTION

Tsetse flies and trypanosomosis are among the pest and diseases that create serious constraint to livestock development in large part of Sub-Saharan Africa. An estimate of 80% of land in Africa is tilled by hand as a result of shortage of draft power courtesy of trypanosomosis infection in cattle (Swallow, 2000). This also limit the number of animals owned by farmers, thereby reducing land cultivation by as much as 50% (Swallow 2000), thus cattle density is reduced by 70%, meat and milk production also reduces by 20% with increase of calf mortality by 20% (Swallow, 2000, Omotainse *et al*., 2004).

Shongom local government area (LGA) is one of the agriculturally productive areas located in southwestern part of Gombe state in the northeastern zone of Nigeria. The area under study is noted for its farming activities. Crops produced are mainly guinea corn, maize, beans and small scale cotton production, small-scale farms resulting to basically subsistence farming constitute 80% - 90% of the land. Animals reared include cattle, sheep, goats and pigs for meat and milk production while donkeys and horses are mainly kept in small numbers as beast of burden and for ceremonies respectively.

The rainy season is usually pre-occupied with crop cultivation activities and to reduce the chances of herdsmen coming into conflict with crop farm owners, they most of this time moves away to the

forest where there is less farming activity resulting into reduced number of herds at the study period. Although there was no reported case of tsetse and trypanosomosis outbreak in the area, however, the occurrence of rivers and streams that meanders in the area coupled with pockets of dense vegetational zones that can provide a good breeding habitat for the vector *Glossina*, informed this survey the commonest diseases found in this area are helminthiasis as confirmed by local herdsmen.

Most currents reports on tsetse and trypanosomiasis status in Nigeria are based on epidemiological surveys conducted on the Jos plateau, (Omotainse *et al.*, 2001, Shamaki, *et al.*, 2002, Yanan *et al*., 2004 and Dede *et al*., 2005) this is due to proximity of the location of the Trypanosomiasis Research Institute in Jos in addition to shortage of research funds to enable wider coverage for surveys in tsetse and trypanosomiasis. The only recent reports close to the study area are that of Omotainse *et al*., (2002) and Shamaki, *et al*., (2008) in Yamaltu-Deba and Kaltungo local government areas respectively with both reporting low prevalence rates of *Trypanosoma* infection.

MATERIALS AND METHODS

Study Area

Shongom local government area of Gombe state, Nigeria lies on latitude $9^{o}44'$ and $9^{o}46'$ N and longitude $11^{o}23'$ and $11^{o}27'$ E, it has an annual rainfall of 560 - 740 mm (July - October) and lies 300 - 400 m above sea level (Anon, 1987). The area is bounded to the north by Akko LGA and to the west by Kaltungo LGA, the south is bound by Billiri LGA while, Karin-Lamido and Alkaleri LGA in both Taraba and Bauchi state forms the eastern boundaries of the local government area. These last two LGAs are well established tsetse zones (Dede *et al*., 2005). The area falls within the Sudan Guinea savannah, at the boundaries of the Sahel savannah belt; that separate the forest zone from the savannah areas. It has sparse vegetation and enjoys hot weather climate most part of the year. A total of seven villages in two districts areas (Filiya District and Lapan District) of the LGA were surveyed for six days in the month of August 2007 when rainfall was at its peak and relative humidity was 79%.

Herds

Animals of the age more than 1 year and of both sexes were randomly selected from sedentary and nomadic herd. They comprise cattle (white Fulani zebu and Borno red breeds), sheep (Yankasa) goats (Sokoto red) and donkeys, grazing alongside the herd. Pigs (in Piggeries within the villages) but usually go out for semi-grazing at the outskirts of the villages, clinical signs were observed and medical history of the herds were obtained from the herd owners prior to commencement of bleeding.

Blood Collection

Three ml of blood samples were collected, using a 5 ml syringe and 18G clean needle (BD Discardit Tin II spain) from the Jugular vein of large and small ruminants and donkeys while the *candal venae cavae* of the pig was used for blood collection after restraining the pig on dorsal recumbency. Blood samples collected were kept in bijou bottles containing ethylenediamine tetraacetic acid (EDTA) as anti coagulant. The bijou bottles were labeled to indicate sex, age, and breed were kept in a coolant to enhance survival of trypanosomes.

Vector

Biconical traps from the Nigerian Institute for Trypanosomiasis and Onchocerciasis Research (NITOR) were used to catch vectors of trypanosome in the area. The traps were placed 100 m apart in dense vegetation along river banks and forested areas and allowed to stand for 24 hours before harvesting, flies caught were immediately identified and kept in conical tubes (Dede, 2005).

Diagnosis

Diagnosis of animal trypanosomosis was achieved by standard parasitological methods of thin and thick films for morphological identification and concentration method using hematocrit centrifugation technique (HCT) (Woo and Kauffman, 1972).

Samples Analysis

Blood samples were examined for hemoparasite using standard trypanosome detection method (STDM) and hematocrit centrifugation technique (HCT) while thin and thick films were stained with Giemsa and slides were examined microscopically x1,000 magnification under oil immersion. Packed cell volume (PCV%) was read off PCV meter reader (Hawksley Ltd. England) after spinning blood samples in terminally sealed (using plasta seal) heparinized capillary tube (superior marine-field–Germany) in a centrifuge at 1000 xg / 5 minutes. Buffy coats were examined using microscope (ERNST LEITZ Wetzlar-GMBH-Germany) at x100 magnification.

RESULTS

There was complete absence of *Glossina* (tsetse) and *Simulium* (black fly) catches throughout the period of survey but other biting flies such as *Stomoxys,* tabanids and *Chrysops* were found in low density (Table 1).

Table 1. Distribution of biting flies in Shongom Local Government Area (LGA)

District	**TC**	***Glossina***	***Stomoxys***	**Tabanid**	***Chrysops***	***Simulium***
Filiya	1	0	0	0	1 (100%)	0
Lapan	3	0	1 (33.3%)	1 (33.3%)	1 (33.3%)	0
Total	**4**	**0**	**1 (25%)**	**1 (25%)**	**2 (50%)**	**0**

Note: Percentage as calculated from a total catch of 4 biting flies.
TC: Total catch

However, from a total of 203 blood samples screened only 11 (5.42%) were found to be positive for haemoparasites and most of it *Babesia* 8 (72.7%) while only 1 (9.1%) was found to be positive for *Trypanosoma vivax,* microfilariae or *Anaplasma* (Table 2).

Table 2. Distribution of hemoparasites in Shongom L.G.A.

District	**Total No. of samples**	**Total No. of positive**	***T. brucei***	***T. vivax***	***T. congolense***	***T. theilesi***	**M/f**	***Babasia***	***Anaplasma***
Filiya	103	11 (0.7%)	0	1 (9.1%)	0	0	1 (9.1%)	8 (72.7%)	1 (9.1%)
Lapan	100	0	0	0	0	0	0	0	0
Total	**203**	**11 (5.41%)**	**0 (0%)**	**1 (9.1%)**	**0 (0%)**	**0 (0%)**	**1 (9.1%)**	**8 (72.7%)**	**1 (9.1%)**

M/f = Microfilariae

There was no significant (P<0.05) difference in the PCV% of the infected and non-infected animals (Table 3). Equally there is no animal sex preference in parasites distribution as indicated in Table 4. While Table 2 indicates that these hemoparasites are basically a menace in ruminant species.

Table 3. Mean PCV (%) of infected and non infected animals

	Sex	**No. of Samples**	**Mean ± SD (PCV %)**
Infected	Male	5	33.1±3.3
	Female	6	31.5±5.1
	Total	**11**	**32.3±4.2**
Non-infected	Male	55	33.4±1.5
	Female	137	31.9±0.8
	Total	**192**	**32.7±1.2**

Table 4. Distribution of hemoparasites in different sexes of animals in Shongom LGA.

Animals	Sex	Sample size	No. of positive	Species						
				T. brucei	*T. vivax*	*T. congolense*	*T. theileri*	M/f	*Babesia*	*Anaplasma*
Cattle	Male	15 (31.9%)	3 (20.0%)	0	0	0	0	0	2 (66.7%)	1 (33.3%)
	Female	53 (34.0%)	8 (15.1%)	0	1 (12.5%)	0	0	1 (12..5%)	6 (75.0%)	0
	Total	65 (33.5%)	11 (6.2%)	0	1 (9.1%)	0	0	1 (9.1%)	8 (72.7%)	1 (9.1%)
Sheep	Male	11 (23.4%)	0	0	0	0	0	0	0	0
	Female	46 (29.5%)	0	0	0	0	0	0	0	0
	Total	27 (28.1%)	0	0	0	0	0	0	0	0
Goats	Male	5 (10.6%)	0	0	0	0	0	0	0	0
	Female	11 (5.5%)	0	0	0	0	0	0	0	0
	Total	16 (7.9%)	0	0	0	0	0	0	0	0
Donkeys	Male	0	0	0	0	0	0	0	0	0
	Female	3 (1.9%)	0	0	0	0	0	0	0	0
	Total	3 (1.5%)	0	0	0	0	0	0	0	0
Pigs	Male	16 (34.0%)	0	0	0	0	0	0	0	0
	Female	43 (27.6%)	0	0	0	0	0	0	0	0
	Total	3 (1.5%)	0	0	0	0	0	0	0	0
	Grand Total	203	11 (5.4%)	0 (0%)	1 (9.1%)	0 (0%)	0 (0%)	1 (9.1%)	8 (72.7%)	1 (9.1%)

DISCUSSION

The prevalence of trypanosomosis (9.1%) in the area is supported by earlier research findings (Omotainse *et al.*, 2004 and Shamaki *et al.*, 2008) which indicate low rate of trypanosomiasis in the area. Contrary to reports of trypanosomiasis on the Jos Plateau (Shamaki *et al*., 2002, Kalejaiye *et al*., 2004 and

Yanan *et al*., 2005), the absence of trypanosomiasis in the area is due to its location, where by its being separated from the endemic areas by Sahel savannah belt which forms the boundaries from the forest zone.

The absence of tsetse flies in the area indicate the absence of biological transmission of trypanosomes, rather transmission can be mechanical (Sumba *et al*., 1998) due to the presence of few mechanical transmitters (tabanids and *stomoxys*) however, transmission can equally be by transhumance migration as the normads are known wanderers and can move through endemic zones like the Jos Plateau without taking any prophylactic treatments, which also indicates the prevalence of trypanosomes in blood of large ruminants. These animals might have passed through infected areas and carried the infection along in their search for pasture. The high prevalent rate of babesiosis is an indication of tick infestation especially in rainy season (Shamaki *et al*., 2007).

The absence of tsetse flies in these areas associated with low infection rate of non-zoonotic trypanosomes, suggest that the area is good for animal breeding with least public health risks in terms of trypanosomosis.

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